

# PATENT ABSTRACTS OF JAPAN

Publication number : 08-169462  
Date of publication of application : 02.07.1996

Int.Cl.

B65D 47/34  
B65D 47/40

Application number : 06-336316

Date of filing : 21.12.1994

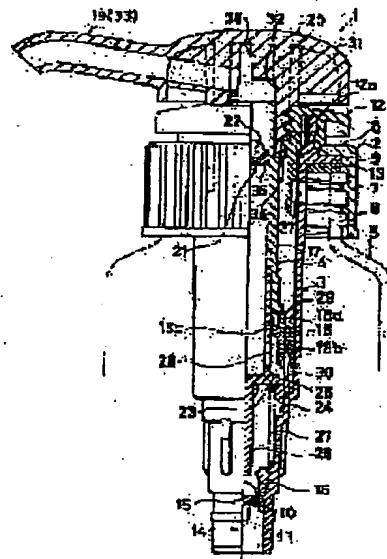
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## LIQUID EJECTION PUMP

### Abstract:

**PURPOSE:** To provide an excellent liquid ejection pump without dripping, which prevents the liquid from drying and solidifying.

**CONSTITUTION:** The liquid in a cylinder 3 is introduced into a stem through a pierced hole 28 at the lower end of the peripheral wall of the stem 17 opened by pushing down a head 20 and jetted out from a nozzle through a delivery valve 21. When the head is raised the pierced hole 28 is closed by a circular piston 18 and the liquid in the container is sucked up into the cylinder through a suction valve 14, in this liquid ejection pump. The circular piston is always pushed up against the stem and the pierced hole 28 is closed only at the uppermost position of the stem. When the volume in the nozzle is  $V_a$ , the volume in the flow path in which the delivery valve body 22 can be vertically moved is  $V_b$ , and the volume of delivery valve body is  $V_c$  respectively, the vertically movable width of the delivery valve body is regulated so that  $V_b - V_c$  is equivalent to  $V_a$  or larger than  $V_a$ .



(19) 日本国特許庁 (JP)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平8-169462

(43) 公開日 平成8年(1996)7月2日

(51) Int CL\*

B 65 D 47/34

47/40

登録記号 戸内整理番号

B

P I

技術表示箇所

F

A

特許請求 未請求 請求項の数2 FD (全8頁)

(21) 出願番号

特願平8-336318

(22) 出願日

平成8年(1996)12月21日

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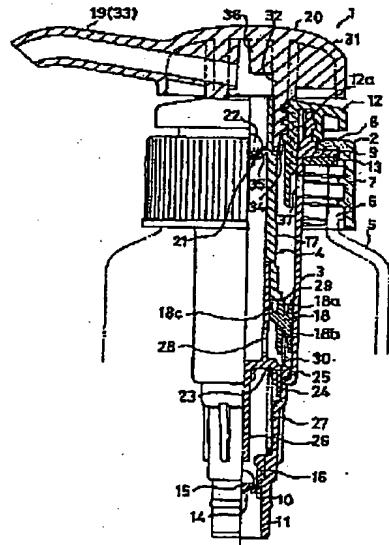
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(54) 【発明の名称】 液体噴出ポンプ

(57) 【要約】

【目的】 液たれがなく、しかも液の乾燥固化を防止できる優れた液体噴出ポンプを提案するものである。

【構成】 押し下げヘッド20を押し下げるにより開口したシステム17周縁部下端の透孔28を介してシリンダ3内の液をシステム内に導入させるとともに、吐出弁21を介してノズル19より噴出させ、押し下げヘッドの上昇時には透孔28を環状ピストン18cにより閉塞するとともに、容器体内の液を吸い込み弁14を介してシリンダ内へ吸い上げる如く構成した液体噴出ポンプであって、上記環状ピストンをシステムに対して常に上方に付勢させるとともに、システム最上昇位置でのみ透孔28を閉塞可能に構成した。また、請求項2発明では、ノズル内の容積をV<sub>a</sub>とし、吐出弁体22の上下動可能な部分の流路内容積をV<sub>b</sub>とし、吐出弁体の体積をV<sub>c</sub>とした時、V<sub>b</sub>-V<sub>c</sub>がV<sub>a</sub>と同じか大きくなる如く吐出弁の上下動幅を規制した。



て大きくなる。特に好ましくは、10mm以上の幅が望ましい。

【0039】そして、上下動部材4を押し下げて液を注入後、上下動部材4が上昇する際には負圧化するシリンドラ3内に透孔28を介してステム17内の液が逆流し、また、吐出弁体22の上下動する流路内の液が吐出弁21上流のステム17内へ、更に、ノズル19内の液が上記流路内へ逆流する如く構成している。この際、 $V_b - V_c$ が $V_a$ と同じか大きければノズル内の液は略上記流路内へ逆流する。

【0040】尚、上記各部材は合成樹脂、金属、特に弾力性を有するものあってはエラストマー等を適宜選択使用して形成する。

【0041】

【発明の効果】以上説明した如く本発明ポンプは、環状ピストンをシステムに対して常に上方へ付勢させるとともに、システム最上昇位置でのみ透孔を閉塞可能に構成したので、粘性を有する液の吐出用として本発明ポンプを用いれば、押し下げヘッドを押し下げて液を噴出した後ヘッドが上昇する際に、吐出弁が閉じる迄の間にシステム内の液が上記透孔を介してシリンドラ内へ逆流し、それに伴って吐出弁体が上下動する流路内の液がシステム内へ逆流し、更にノズル内の液が上記流路内に逆流するため、ノズル先端からの液ダレを解消できるものであり、液の乾燥固化を極力防止できるものである。

【0042】しかも従来同様、使用時に誤って容器を開いてもシステム最上昇位置では環状ピストンが透孔を閉塞\*

\*しているため、ノズル先端からの液の漏出を極力防止できる効果を兼ね備えている。

【0043】また、従来品の極一部の構造を変えることにより製造できるため、製造が容易で安価に製造できる利点も兼ね備えている。

【0044】更に、ノズル内の容積を $V_a$ とし、吐出弁体の上下動が可能な部分の流路内容積を $V_b$ とし、吐出弁体の体積を $V_c$ とした時、 $V_b - V_c$ が $V_a$ と同じか $V_a$ より大きくなる如く吐出弁体の上下動幅を規制すれば、ノズル内の液は略全量が吐出弁の上下動する流路内へ逆流するため、より良好な液ダレの防止、液の乾燥固化の防止を行えるものである。

【図面の簡単な説明】

【図1】 本発明の一実施例を示す断面図である。

【図2】 同実施例の押し下げヘッド部分の説明図である。

【図3】 同実施例のヘッドを押し下げた際の説明断面図である。

【図4】 同実施例のヘッドが上昇する際の説明断面図である。

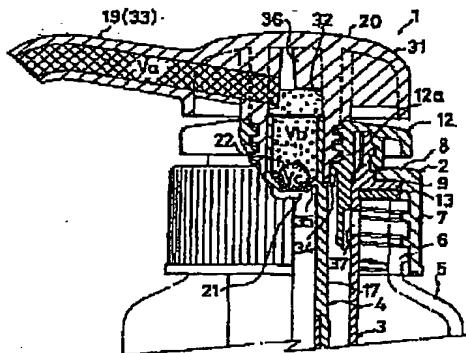
【図5】 同実施例のヘッド最上昇位置の説明断面図である。

【図6】 従来のポンプの一例を示す断面図である。

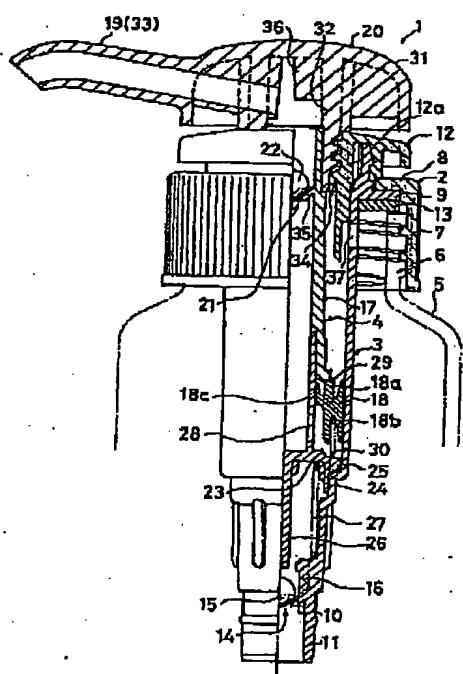
【符号の説明】

2…装着キャップ、3…シリンドラ、14…吸い込み弁、17…システム、18…環状ピストン、19…ノズル、20…押し下げヘッド、21…吐出弁、22…吐出弁体、28…透孔

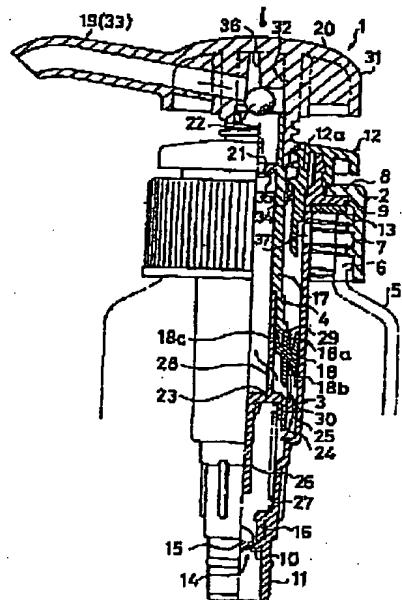
【図2】



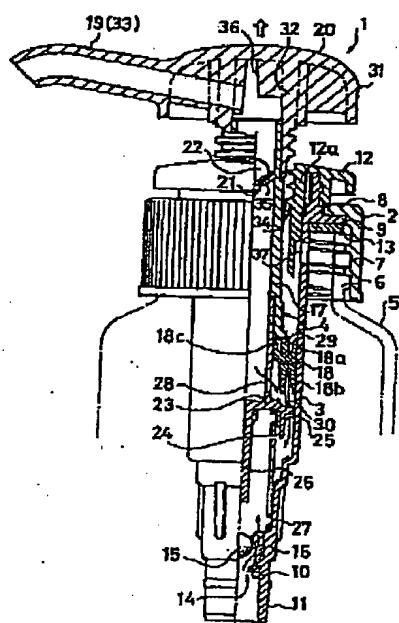
【図1】



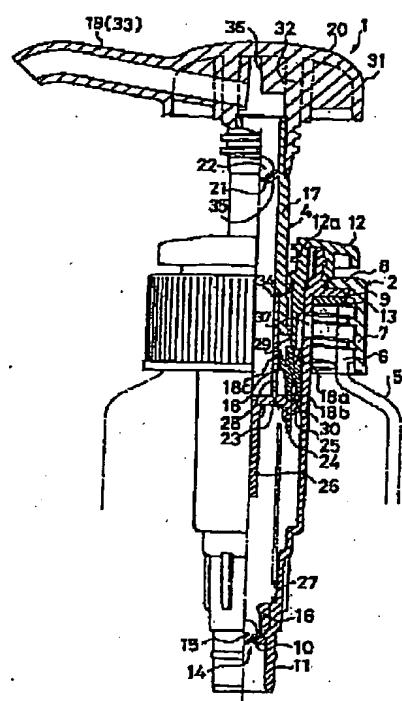
【図3】



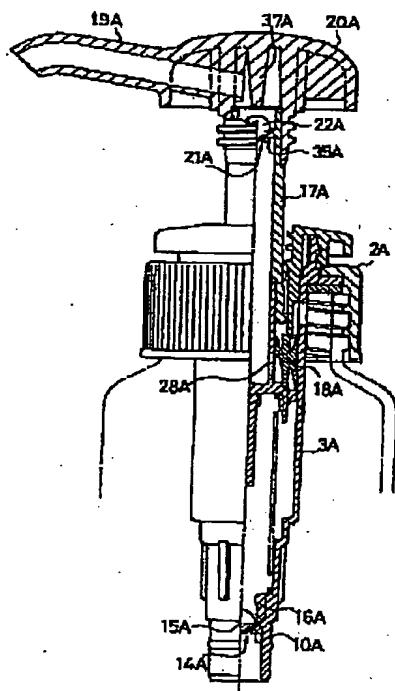
【図4】



【図5】



【図6】



**\* NOTICES \***

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**CLAIMS**

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**[Claim(s)]**

[Claim 1] While making liquid in a cylinder introduce in a stem via the bore 28 which carried out the opening by having the following and depressing the above-mentioned push down head, In a liquid jetting pump constituted so that it might be made to blow off from the nozzle 19 via the discharge valve 21 and liquid in a bottle object might be sucked up into a cylinder via the suction valve 14 by negative pressure-ization in the above-mentioned cylinder at the time of a rise of the push down head 20, A liquid jetting pump characterized by constituting the bore 28 only from a stem maximum rising position so that a blockade is possible while making the above-mentioned annular piston 18 always energize up to a stem.

The mounting cap 2 into which a bottle object mouth neck is made to fit.

The cylinder 3 which forms the suction valve 14 in lower end circles made to hang into a bottle object while making it fix to a bottle object with this cap.

The stem 17 of a lower end surface blockade which forms the discharge valve 21 which blockaded a valve port provided in the internal upper part by the valve element 22 which moves up and down by fluid pressure while providing this center section in a cylinder by an upper part energizing state so that up-and-down motion was possible.

While up-and-down motion of prescribed width makes it fit into this stem periphery lower end part possible, The annular piston 18 which formed the bore 28 which a periphery edge was made to fit into a cylinder inside surface so that sliding is possible, and was drilled in a stem lower end part so that opening and closing were possible, and the push down head 20 with the nozzle 19 which formed successively to the above-mentioned stem upper bed, and provided the mounting cap upper part so that up-and-down motion was possible.

[Claim 2] The liquid jetting pump according to claim 1 which regulates up-and-down motion width of the delivery valve body 22 so that it may consist [ whether  $V_b - V_c$  is the same as  $V_a$ ,

and ] of Va(s), when capacity in the above-mentioned nozzle 19 is set to Va, channel content volume of a portion which can move the delivery valve body 22 up and down is set to Vb and volume of the delivery valve body 22 is set to Vc.

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[Translation done.]

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Industrial Application]**This invention relates to the liquid jetting pump which uses viscous liquid for carrying out the regurgitation in detail about a liquid jetting pump.

**[0002]**

**[Description of the Prior Art]**While making it fix to a bottle object as a liquid jetting pump with \*\*\*\* shown in drawing 6, the mounting cap 2A into which a bottle object mouth neck is made to fit, and this cap, While providing the cylinder 3A which forms the suction valve 14A in the lower end circles made to hang into a bottle object, and this center section in a cylinder by an upper part energizing state so that up-and-down motion is possible, While up-and-down motion of prescribed width makes it fit into this stem periphery lower end part possible with the stem 17A of the lower end surface blockade which forms the discharge valve 21A which blockaded the valve port provided in the internal upper part by the valve element 22A which moves up and down by fluid pressure, The thing provided with the annular piston 18A which formed the bore 28A which the periphery edge was made to fit into a cylinder inside surface so that sliding is possible, and was drilled in the stem lower end part so that opening and closing were possible, and the push down head 20A with the nozzle 19A which formed successively to the above-mentioned stem upper bed, and provided the mounting cap upper part so that up-and-down motion was possible is known.

**[0003]**These are made to blow off from a nozzle via a discharge valve, while an annular piston goes up relatively to a stem, and a bore carries out an opening and makes the application-of-pressure liquid in a cylinder introduce in a stem via the bore which carried out the opening by depressing a push down head. On the other hand, at the time of a rise of a push down head, an annular piston descends relatively, and a bore closes, and it constitutes so that the liquid in a bottle object may be sucked up into a cylinder via a suction valve by negative pressure-

ization in a cylinder.

[0004]As for the conventional suction valve 14A and the discharge valve 21A of this seed pump, what consists of the valve seat 10A, 35A, and the ball-like valve element 15A laid on each valve seat and 22A is common. Although a ball-like valve element goes up by fluid pressure at the time of valve opening, it constitutes so that the ball-like valve element which went up by the bar form projection 37A installed from the left locking 16A in the \*\*\*\* cylinder shown, for example in drawing 6 and the top wall rear face of the push down head may be stopped. Although such up-and-down motion width changes a little with sizes of a container, etc., generally it is constituted by smallness width of about 1-4 mm, and liquid makes the valve port sufficient minimum clearance to pass at the time of valve opening.

[0005]Generally, from the front face of a head, a nozzle is horizontally extended to the front and the tip is carrying out inclination descent to the lower part.

[0006]

[Problem(s) to be Solved by the Invention]Even if it will be in the state where the pump of these former pushed down the use intermediate case accidentally, and the ball-like valve element 22A of the discharge valve 21A shifted from the valve seat 35A, in order that the annular piston 18A may blockade the bore 28A and may intercept the inside of the cylinder 3A and the stem 17A, a break through of the liquid from the nozzle 29A can be prevented as much as possible - it excels.

[0007]However, this conventional seed pump may produce the inconvenience that the liquid which inconvenience, like the liquid which remains in a nozzle after liquid jet drips from that tip may arise, and remains in the tip part in a nozzle carries out dry solidification. An exterior may also serve as hindrance of jet operation of it not being not only desirable but liquid, and that of this dry solidification is not preferred.

[0008]This invention relates to improvement of a pump such conventionally, and does not have a liquid lappet, and the outstanding liquid jetting pump which can moreover prevent dry solidification of liquid is proposed.

[0009]Since it can manufacture by changing the structure of the pole of elegance part conventionally, the pump which has an advantage which manufacture can be easy and can be manufactured cheaply is proposed.

[0010]

[Means for Solving the Problem]In order that a pump of this claim 1 invention may solve an aforementioned problem, while making it fix to a bottle object with the mounting cap 2 into which a bottle object mouth neck is made to fit, and this cap, While providing the cylinder 3 which forms the suction valve 14 in lower end circles made to hang into a bottle object, and this center section in a cylinder by an upper part energizing state so that up-and-down motion is possible, While up-and-down motion of prescribed width makes it fit into this stem periphery

lower end part possible with the stem 17 of a lower end surface blockade which forms the discharge valve 21 which blockaded a valve port provided in the internal upper part by the valve element 22 which moves up and down by fluid pressure, The annular piston 18 which formed the bore 28 which a periphery edge was made to fit into a cylinder inside surface so that sliding is possible, and was drilled in a stem lower end part so that opening and closing were possible, It has the push down head 20 with the nozzle 19 which formed successively to the above-mentioned stem upper bed, and provided the mounting cap upper part so that up-and-down motion was possible, While making liquid in a cylinder introduce in a stem via the bore 28 which carried out the opening by depressing the above-mentioned push down head, In a liquid jetting pump constituted so that it might be made to blow off from the nozzle 19 via the discharge valve 21 and liquid in a bottle object might be sucked up into a cylinder via the suction valve 14 by negative pressure-ization in the above-mentioned cylinder at the time of a rise of the push down head 20, While making the above-mentioned annular piston 18 always energize up to a stem, it constituted as a liquid jetting pump constituting the bore 28 only from a stem maximum rising position so that a blockade is possible.

[0011]A pump of claim 2 invention sets capacity in the above-mentioned nozzle 19 to  $V_a$ , When channel content volume of a portion which can move the delivery valve body 22 up and down was set to  $V_b$  and volume of the delivery valve body 22 was set to  $V_c$ , it constituted as the liquid jetting pump according to claim 1 which regulates up-and-down motion width of the delivery valve body 22 so that it may consist [ whether  $V_b-V_c$  is the same as  $V_a$ , and ] of  $V_a(s)$ .

#### [0012]

[Function]It is used equipping the bottle object 5 which stored the fluid which has viscosity. For example, if the head 20 which removed the screwing portion of the vertically moving member 4 from the state of drawing 1, raised the head 20, and went up is depressed, the inside of the cylinder 3 will be pressurized, and the liquid in the cylinder 3 passes along the bore 28 which carried out the opening, opens the discharge valve 21 from the stem 17, and blows off to the exterior via the nozzle 19. The delivery valve body 22 is pushed up up to the locking plate 36 undersurface by fluid pressure in this case (refer to drawing 3).

[0013]Subsequently, if press of the head 20 is canceled, while the vertically moving member 4 will go up by the resiliency of the coil spring 27, the delivery valve body 22 descends relatively to the vertically moving member 4 by negative pressure-ization in the cylinder 3, a valve port is blockaded, and the discharge valve 21 closes. The liquid in the channel where the delivery valve body 22 moves up and down in the meantime flows backwards into the stem 17 of the valve seat upper stream, and the liquid in the nozzle 19 flows backwards in the above-mentioned channel in connection with it. The liquid in the stem 17 flows backwards into the cylinder 3 through the bore 28. On the other hand, the suction valve 14 opens by negative

pressure-ization in the cylinder 3, and the fluid in a bottle object is introduced into the cylinder 3 via the suction valve 14 (refer to drawing 4).

[0014]It is introduced until the liquid in a bottle object is introduced in the cylinder 3 via the suction valve 14 and the stem 17 reaches a maximum rising position, even after the discharge valve 21 closes. In the maximum rising position of the stem 17, the annular piston 18 is stopped by the container liner 12a undersurface of the locking member 12, the annular piston 18 resists energization of the coil spring 30, and descends relatively, and the bore 28 is blockaded (refer to drawing 5).

[0015]

[Example]Hereafter, the example of this invention is described with reference to drawings.

[0016]Drawing 1 thru/or drawing 5 show one example of this invention, and one in a figure shows a liquid jetting pump. This pump 1 is provided with the mounting cap 2, the cylinder 3, and the vertically moving member 4.

[0017]The mounting cap 2 fixes the cylinder 3 to the bottle object 5, and installs and constitutes the inward-flange-like top wall 8 from a peripheral wall 7 upper-bed edge made to screw in bottle object mouth neck 6 periphery.

[0018]The cylinder 3 is making the lower end part hang into a bottle object while making it fix to the bottle object 5 with the above-mentioned mounting cap 2.

[0019]While the cylinder 3 makes the cylindrical shape which carried out the opening of the upper-and-lower-ends side in this example, the diameter of the lower part is reduced to three steps, and while protruding the outward flange 9 from a peripheral upper part, the valve seat 10 of the flange shape which inclines toward an inner direction lower part is protruded on an internal lower end part. Constitute valve seat 10 lower part in the fit in cylinder part 11 for suction pipe fitting, the upper bed of a suction pipe (not shown) is made to attach in this fit in cylinder part 11, and that lower part is made to hang in the lower end part in a bottle object.

[0020]Fitting and fixing of the locking member 12 for depressing the vertically moving member 4 in an upper bed part, and stopping in the state is carried out. This locking member 12 installs the fit in cylinder part into which the cylinder 3 upper-bed periphery was made to fit via a concavo-convex engagement means from doughnut tabular top plating, and installs and constitutes the container liner 12a made to fit into a cylinder 3 inner-circumference upper bed part from this top plating internal circumference edge. The container liner 12a and the cylinder 3 upper-bed inner surface are attaching the spiral rib for having given the baffle by engagement between vertical projected rims, etc., and making a vertically moving member screw on the container liner 12a inner circumference upper part.

[0021]And while making the above-mentioned outward flange 9 lay in the bottle object mouth neck 6 upper surface via the packing 13, it constitutes so that the flange 9 may be pinched on the top wall 8 of the mounting cap 2 and the bottle object mouth neck 6 upper surface which

were made to screw on a mouth neck periphery.

[0022]The lower part in the cylinder 3 is equipped with the suction valve 14. This suction valve 14 is constituted from the above-mentioned valve seat 10 and the valve element 15 of the shape of a ball made to lay on this valve seat 10, The left locking 16 of hoop direction plurality was protruded on the peripheral wall part of the valve seat 10 circumference, it stopped so that it could not slip out of the valve element 15 upwards any more by the projected part of each left locking 16 upper-bed circles side, and up-and-down motion width is regulated.

[0023]The vertically moving member 4 is provided with the stem 17, the annular piston 18, the push down head 20 with the nozzle 19, and the discharge valve 21.

[0024]The stem 17 is a thing of the lower end surface blockade which provided the center section in the above-mentioned cylinder 3 by the upper part energizing state so that up-and-down motion was possible, and equips the internal upper part with the discharge valve 21. It blockades by the valve element 22 which moves up and down by fluid pressure, and this discharge valve 21 constitutes the valve port provided in the inside upper part of a stem.

[0025]While protruding the flange 23 from a periphery lower end part to the method of outside in this example by the stem 17 making the cylindrical shape which made the lower end surface blockade, from this flange 23 periphery edge, a cylinder inside surface and a crevice are opened and the pendent wall 24 is installed. The tabular projection 25 of hoop direction plurality is protruded on pendent wall 24 externally upper part. The peripheral face of each projection 25 has played the role which amends the orbit, when a cylinder inside surface and few crevices are opened and horizontal Bure has on the occasion of up-and-down motion of the stem 17. The bar form projection 26 is installed from a stem bottom wall rear-face center section, and it serves to depress, when the lower end is made to hang to the above-mentioned left locking 16 upper-bed part position of the cylinder 3 and the suction-valve object 15 is caught between the upper bed projected parts of each left locking 16. At this example, the stem 17 consists of two members.

[0026]The coil spring 27 is made to intervene between the upward steps formed in the flange 23 above-mentioned undersurface and cylinder 3 inner surface of the above-mentioned left locking 16 upper-bed side portion, and the stem 17 is made to always energize upwards.

[0027]It has formed the bore 28 which the periphery edge was made to fit into a cylinder inside surface so that sliding is possible, and was drilled in the stem 17 lower-end part so that opening and closing are possible, while up-and-down motion of prescribed width makes the annular piston 18 fit into the above-mentioned stem 17 periphery lower end part possible.

[0028]While the upper and lower sides protrude the outside sliding part 18b which makes the cross sectional circle arc tabular which projects to the method of outside from a cylindrical base 18a peripheral face, from base 18a inner skin, the inside sliding part 18c of the shape of an upward skirt board which carries out an inclination rise upwards is protruded, and the

annular piston 18 consists of this examples. On the other hand, the downward step 29 is formed in the above-mentioned outward-flange 23 upper-part prescribed position of stem 17 periphery, and the bore 28 is drilled in the stem peripheral wall part between this step 29 and the outward flange 23.

[0029]and the outside sliding part 18b -- cylinder 3 inner surface -- liquid, while making it fit in so that sliding is [ being densely and ] possible, an inside sliding part -- stem 17 periphery -- liquid -- the predetermined width to the position to which the base 18a undersurface contacts the flange 23 above-mentioned upper surface is made to fit in to the stem 17, from the position to which it is made to fit in so that sliding is [ being densely and ] possible, and the base 18a upper surface contacts the step 29 above-mentioned undersurface, so that up-and-down motion is possible

[0030]While making this annular piston 18 always energize upwards to the stem 17, the bore 28 consists of this inventions only in the stem maximum rising position so that a blockade is possible.

[0031]The coil spring 30 is made placed between each projection 25 above-mentioned upper surface of the stem 17, and the root undersurface with the base 18a of the outside sliding part 18b in the annular piston 18 in this example. It constitutes so that it may constitute so that it may be in the state where the above-mentioned base 18a upper surface always contacts the step 29 above-mentioned undersurface, therefore the inside of a cylinder and a stem may always be open for free passage via the bore 28. This coil spring 30 chooses a thing with that small resiliency as compared with the coil spring 27 which is making the stem 17 energize up. When the stem 17 is pushed up upwards, the contact stop of the base 18a upper bed of the annular piston 18 is carried out on the container liner 12a undersurface of the above-mentioned locking member 12. On the other hand, the stem 17 will be in the state where the base 18a undersurface is further close to the flange 23 upper surface and where it was gone up and stopped to the position, therefore the bore 28 was blockaded in the stem maximum rising position.

[0032]37 in a figure is the bore for outside air introduction provided in the cylinder. The open air is introduced into the bottle object negative-pressure-ized via this bore 37 from between the stem 17 and the container liners 12a at the time of a rise of a vertically moving member, and it is intercepted by the annular piston when a stem is in a maximum rising position.

[0033]The push down heads 20 are formed successively to stem 17 upper bed, and provide the mounting cap 2 upper part so that up-and-down motion is possible. In this example, the push down head 20 has the casing 31 which makes the cylindrical shape of the lower end surface opening which installed the peripheral wall from the periphery of a top wall, makes the

vertical tube 32 lower part installed from the center of the top wall undersurface of this casing 31 attach in a stem 17 periphery upper bed, and is fixed to the stem 17. Penetrate a casing peripheral wall, the lateral cylinder 33 which carried out the opening of the base end to vertical tube 32 upper front is made to project to that front, and this lateral cylinder 33 is constituted as the nozzle 19. The nozzle 19 is constituted so that the inclination rise of the base end may be carried out to the front, and the tip is carrying out inclination descent to the lower part. By constituting in this appearance, prevention of liquid sagging can be aimed at more.

[0034]When a spiral rib is attached around vertical tube 32 periphery of the portion projected below and the vertically moving member 4 is depressed from the casing 31, where it screwed with the spiral rib of the above-mentioned locking member 12 and the vertically moving member 4 is depressed, it constitutes so that a stop is possible. the diameter reduction part inner surface which the pendent wall 24 above-mentioned outside surface which protruded from the stem 17 on that occasion provided in the cylinder peripheral wall lower part -- liquid -- it constitutes so that it may fit in densely. annular protruded piece 34 inner circumference of the shape of a downward skirt board which the periphery lower end part of the vertical tube 32 provided in the container liner 12a inner surface of the locking member 12 -- liquid -- it constitutes so that it may fit in densely.

[0035]By fluid pressure, the discharge valve 21 has formed the valve element 22 which blockades the valve port provided in the upper part in the stem 17 so that up-and-down motion is possible.

[0036]By protruding on the upper part in the stem 17 the valve seat 35 of the flange shape which carries out inclination descent to an inner direction, form a valve port in the center, and make the ball-like valve element 22 lay on the valve seat 35, a valve port is made to blockade, and the discharge valve 21 consists of this examples. The valve element 22 constitutes the between to the position which contacts the locking plate 36 undersurface installed from the top wall of the above-mentioned casing 31 so that up-and-down motion is possible.

[0037]this invention pump is used for jet of viscous high liquid.

That in which they have the viscosity of 500 cps - about 15000 cps is used.

Thus, in using viscous high liquid, although the delivery valve body 22 pushed up by fluid pressure has falling [ little ] to up to the valve seat 35 immediately by that self-weight and changes a little with the viscosity of liquid, valve element weight, etc., it moves up and down in accordance with the flow of liquid in general. Therefore, such an error is not produced between the rate of flow of liquid, and \*\*\*\*\* of a valve element.

[0038] or [ that  $V_b - V_c$  is the same as  $V_a$  when capacity in the above-mentioned nozzle 19 is set to  $V_a$ , liquid flow channel content volume of the portion which can move the delivery valve body 22 up and down is set to  $V_b$  in this example and volume of the delivery valve body 22 is set to  $V_c$  ] -- or the up-and-down motion width of the delivery valve body 22 is regulated so that

it may become large. Although the actual up-and-down motion width of the delivery valve body 22 by this regulation changes with the length of a nozzle and an inside diameter, inside diameters of the stem 17, etc., it becomes large as compared with 5 mm - about 30 mm, and the conventional valve that laid the ball valve on the valve seat and constituted it. A width of not less than 10 mm is desirable especially preferably.

[0039]And the liquid in the stem 17 flows backwards via the bore 28 in the cylinder 3 negative-pressure-ized when the vertically moving member 4 is depressed and the vertically moving member 4 goes up after pouring out liquid. It constitutes so that the liquid in the channel where the delivery valve body 22 moves up and down may flow backwards into the stem 17 of the discharge valve 21 upper stream and the liquid in the nozzle 19 may flow backwards into the above-mentioned channel further. Under the present circumstances, if  $V_b - V_c$  is the same as  $V_a$  or large, the liquid in a nozzle will flow backwards into the abbreviated above-mentioned channel.

[0040]each above-mentioned member has a synthetic resin, metal, especially elasticity -- if it is, selection use is carried out suitably and an elastomer etc. are formed.

[0041]

[Effect of the Invention] As explained above, while this invention pump makes an annular piston always energize upwards to a stem, Since the bore was constituted only from a stem maximum rising position so that a blockade was possible, if this invention pump is used as an object for the regurgitation of liquid which has viscosity, When a head goes up after depressing a push down head and blowing off liquid, Since the liquid in a stem will flow backwards into a cylinder via the above-mentioned bore by the time a discharge valve closes, the liquid in the channel where a delivery valve body moves up and down in connection with it flows backwards into a stem and also the liquid in a nozzle flows backwards in the above-mentioned channel, liquid sagging from a nozzle tip is cancelable.

Dry solidification of liquid can be prevented as much as possible.

[0042]And as usual, even if it topples a container accidentally at the time of use, since the annular piston blockades the bore, stem \* has the effect that a break through of the liquid from a nozzle tip can be prevented as much as possible.

[0043]Since it can manufacture by changing the structure of the pole of elegance part conventionally, manufacture also has the advantage which it can be easy and can be manufactured cheaply.

[0044]If the up-and-down motion width of a delivery valve body is regulated so that it may consist [ whether  $V_b - V_c$  is the same as  $V_a$ , and ] of  $V_a(s)$  when capacity in a nozzle is set to  $V_a$ , channel content volume of the portion which can move a delivery valve body up and down is set to  $V_b$  and volume of a delivery valve body is set to  $V_c$ , Since the abbreviated whole

quantity flows backwards into the channel where a discharge valve moves up and down, the liquid in a nozzle can prevent prevention of better liquid sagging, and dry solidification of liquid.

[Translation done.]

**\* NOTICES \***

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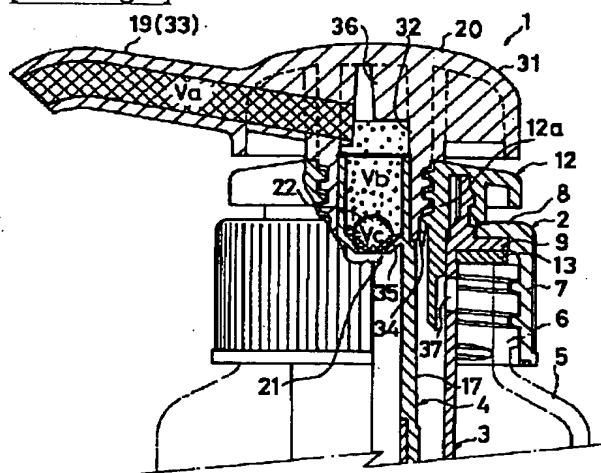
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

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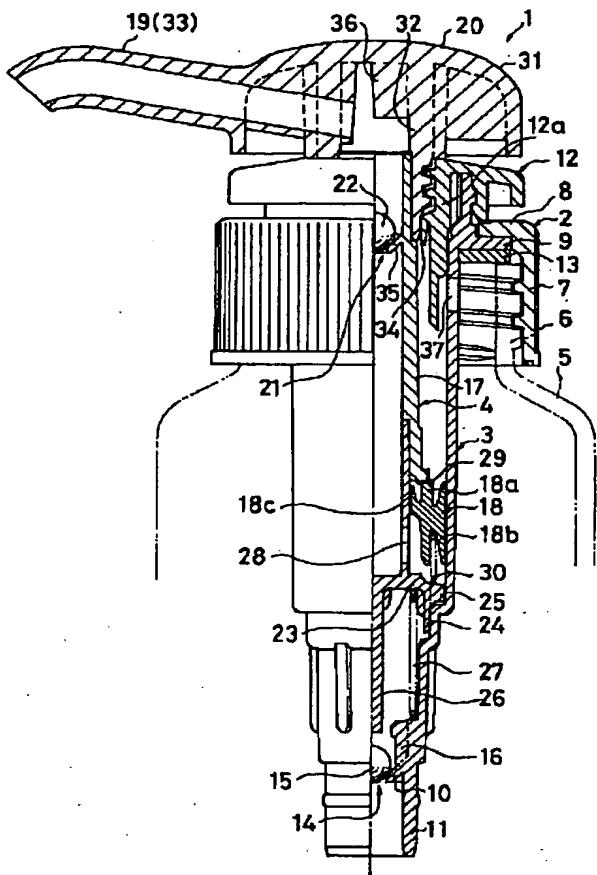
**DRAWINGS**

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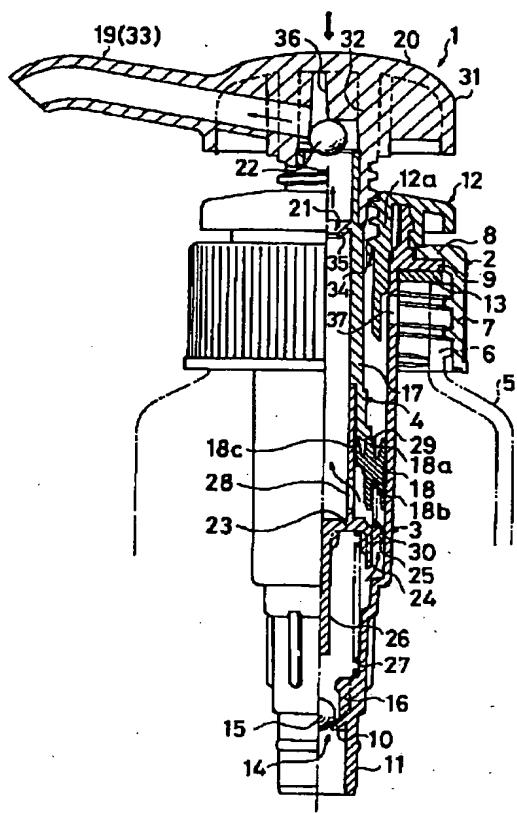
[Drawing 2]



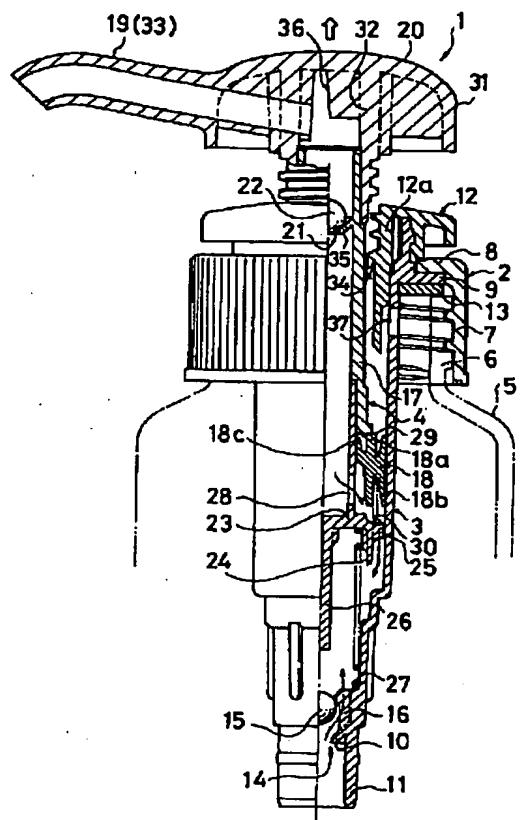
[Drawing 1]



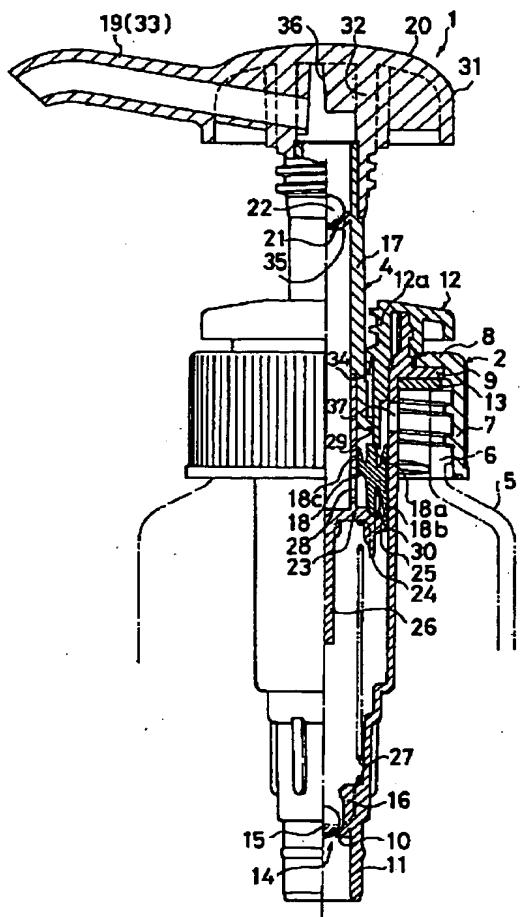
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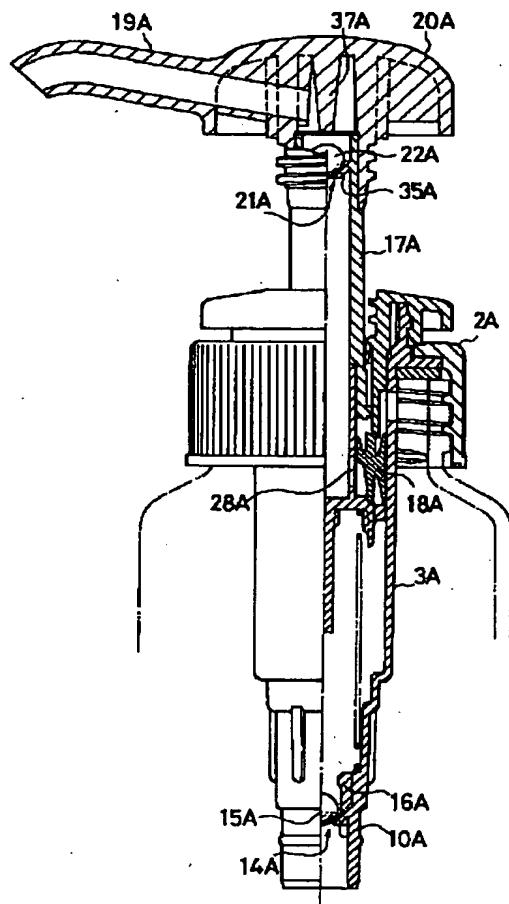
[Drawing 4]



[Drawing 5]



[Drawing 6]



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[Translation done.]